

**NEYVELI LIGNITE CORPORATION LIMITED**

**2x500 MW NEW NEYVELI THERMAL POWER STATION (NNTPS)**

**VOLUME – IIB**

**TECHNICAL SPECIFICATION  
FOR**

**MV CABLE TERMINATION & JOINTING KITS**

**SPECIFICATION NO : *PE-TS-400/402-507-E015*  
REVISION : 0**



**BHARAT HEAVY ELECTRICALS LIMITED  
POWER SECTOR  
PROJECT ENGINEERING MANAGEMENT  
NOIDA, UP (INDIA) – 201301**



TECHNICAL SPECIFICATION FOR  
MV CABLE TERMINATION & JOINTING KITS

SPECIFICATION NO. PE-TS- 400/402-507-E015

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IT IS CONFIRMED THAT OUR TECHNICAL OFFER COMPLIES WITH THE SPECIFICATION IN TOTO & THAT THERE ARE NO TECHNICAL DEVIATIONS.

-----  
BIDDER'S STAMP & SIGNATURE



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**INSTRUCTIONS TO BIDDERS FOR PREPARING TECHNICAL OFFER**

1. Two signed and stamped copies of the following shall be furnished by all bidders as technical offer :
  - a. Unpriced Price Schedule (Annexure-I-A, I-B: BOQ, as enclosed with the specification).
  - b. A copy of this sheet ("Instructions to Bidders for Preparing Technical Offer").
  - c. A copy of previous sheet ("Contents").
2. No other technical submittal such as copies of type test certificates, data sheets, write-up, drawing, technical literature, etc. is required during tender stage. Any such submission, even if made, shall not be considered as part of offer.
3. No comments/ additions/ deletions shall be made by the bidder on the signed & stamped copy of the specification. Any such changes made by the bidder shall not be considered.
4. Confirmations/ comments (if any) regarding delivery schedules shall be furnished as part of the commercial offer. Any reference in the technical offer / covering letter shall not be considered by BHEL.
5. Any comments/ clarifications on technical/ inspection requirements furnished as part of bidder's covering letter shall not be considered by BHEL, and bidder's offer shall be construed to be in conformance with the specification.
6. Any changes made by the bidder in the price schedule with respect to the item description/ quantities, notes etc. from those given in Annexure-IA, IB of specification [Bill Of Quantities] shall not be considered (i.e., technical description, quantities, notes etc. as per specification shall prevail).

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BIDDER'S STAMP & SIGNATURE



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**PREAMBLE**

1.0 The tender document contains two (2) volumes. The bidder shall meet the requirements of all the two volumes.

1.1 **Volume-I (CONDITIONS OF CONTRACT)**

This consists of four parts as below:-

- Volume-IA : This part contains instructions to bidders for making bids to BHEL.  
Volume-IB : This part contains general commercial conditions of the tender & includes provision that vendor is responsible for the quality of item supplied by their sub-vendors.  
Volume-IC : This part contains special conditions of contract.  
Volume-ID : This part contains commercial conditions for erection & commissioning site work, as applicable.

1.2 **Volume-II TECHNICAL SPECIFICATIONS**

Technical requirements are stipulated in Volume-II which comprises of :-

- Volume-IIA : General Technical Conditions  
Volume-IIB : Technical Specification including Drawings, if any.

1.2.1 **Volume-IIB**

This volume is sub-divided into following sections:-

- Section-A : This section outlines the scope of enquiry.  
Section-B : This section provides "Project Information".  
Section-C : This section indicates technical requirements specific to the contract, not covered in Section-D.  
Section-D : This section comprises of technical specifications of equipments complete with data sheet A.  
Data Sheet – A: specifies data and other requirements pertaining to the Equipment.

2.0 The requirements mentioned in Section-C / Data Sheets-A of section-D shall prevail and govern in case of conflict between the same and the corresponding requirements mentioned in the descriptive portion in Section-D.



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SECTION - A

SCOPE OF ENQUIRY



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SCOPE OF ENQUIRY

- 1.0 This specification covers the Design, Manufacture, Inspection and Testing at Manufacturer's works, proper packing and delivery to site of MV Cable Termination & Jointing Kits as mentioned in different sections of this specification for **2x500 MW NEW NEYVELI THERMAL POWER STATION (NNTPS) at NEYVELI in TAMIL NADU.**
- 2.0 It is not the intent to specify herein all the details of design & manufacture. However, the equipment shall conform in all respects to high standards of design engineering and workmanship and shall be capable of performing in continuous commercial operation at site conditions.
- 3.0 The general terms and conditions, instructions to bidders and other attachment referred to elsewhere are hereby made part of the tender specification.
- 4.0 The bidder shall be responsible for and governed by all requirements stipulated hereinafter.
- 5.0 Bidder shall confirm total compliance to the specification without any deviations from technical/quality assurance requirements stipulated.
- 6.0 The documents shall be in English Language and MKS system of units.

|   |   |   |                  |
|---|---|---|------------------|
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## SECTION - B

### PROJECT INFORMATION

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## SALIENT FEATURES OF THE SITE & GENERAL PROJECT INFORMATION

### 1.1 Introduction

The project site at Neyveli has distinct location advantages, being at pit-head distance from the source of lignite supply from Mines, making it convenient for transportation of lignite by belt conveyor. Water source is readily available from the nearby mines lake. Besides, other infrastructure such as access road, railway connection etc, already exist.

### 1.2 Power Plant Site

The power plant site is located at Neyveli, opposite to the now defunct Fertilizer and Briquetting & Carbonization Plant, near TPS-I Expansion and TPS-II.

### 1.3 Project & Site Information

- |                                    |   |  |
|------------------------------------|---|--|
| (i). Owner / Purchaser             | : | Neyveli Lignite Corporation Limited (NLC Ltd), Neyveli, Cuddalore District, Tamil Nadu State, India  |
| (ii). Consultant                   | : | Lahmeyer International (India) Pvt. Ltd (LII), Gurgaon, NCR, India.  |
| (iii). Project Title               | : | 2x500 MW Neyveli New Thermal Power Project (NNTPP)   |
| (iv). Location                     | : | 200 kms south of Chennai and 50 kms south-west of Cuddalore  |
| (v). Latitude                      | : | 11° 34' 00" N to 11° 35' 00" N   |
| (vi). Longitude                    | : | 79° 26' 00" E to 79° 27' 00" E   |
| (vii). Elevation above MSL         | : | (+ ) 67 m  |
| (viii). Nearest Railway Station    | : | Neyveli,   |
| (ix). Nearest Sea Port             | : | Chennai, at a distance of 200 km   |
| (x). Nearest Airport               | : | Chennai, at a distance of 200 km   |
| (xi). Road Access/Approach to Site | : | Connected by Chennai-Thanjavur NH 45C road and state highway connecting Cuddalore – Virudhachalam via Neyveli. Both NH and state high way roads are well connected to NLC township roads. The approach road is approximately 15 kms from Chennai–Thanjavur NH – 45C road |
| (xii). Site Meteorological Data    | : | <ul style="list-style-type: none"> <li>• Max ambient temperature : 42.8° C</li> <li>• Min Ambient Temperature : 26.9° C</li> </ul>   |



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- Wet bulb temp : 29° C
- Max. Relative Humidity : 92 % in the month of September
- Min. Relative Humidity : 23 % in the month of May
- Rainfall : About 1265.7 mm annually (average)
- Wind direction : South West to North East direction
- Wind Speed : 97.2 km/hr (maximum recorded)  
4.3 km/hr (average wind speed)
- Seismicity : As per IS: 1893 (part 4) (Zone-II)  
Importance factor: 1.75.



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**SECTION -C**

**SPECIFIC TECHNICAL REQUIREMENTS**



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1.0 **SCOPE OF ENQUIRY**

- 1.1 This enquiry covers the supply of **MV Cable Termination & Jointing Kits** conforming to this specification.
- 1.2 General technical requirements of the MV Cable Termination & Jointing Kits are indicated in Section-D. Project specific technical/ quality requirements / changes are listed in Section-C.
- 1.3 The stipulations of Section-C, followed by those of Data Sheet-A shall prevail in case of any conflict between the stipulations of Section-C, Data Sheet - A & Section-D.

2.0 **BILL OF QUANTITIES:**

- 2.1 Quantity requirements shall be as per **Annexure-IA AND IB (Bill of Quantities (BOQ))** enclosed.


3.0 **SPECIFIC REQUIREMENTS:**

- 3.1 Technical:

| <i>S. No.</i> | <i>Reference clause No. of Section D (if any)</i> | <i>Specific Requirement/ Change</i> |
|---------------|---|-------------------------------------|
| 1             | NIL   | NIL                                 |

- 3.2 Quality/ Inspection:

| <i>S. No.</i> | <i>Reference clause No. of Section D (if any)</i> | <i>Specific Requirement/ Change</i> |
|---------------|---|-------------------------------------|
| 1             | NIL   | NIL                                 |

|   |   |  |                  |
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**ANNEXURE- I-A**

**BILL OF QUANTITIES (BOQ) WITH AL LUGS – SG PACKAGE**

| S. NO. | ITEM CODE   | ITEM NAME                             | UOM | QUANTITY |
|--------|-------------|---------------------------------------|-----|----------|
| 1      | 507-24404-A | TERM. KIT 11KV 1C-240 AL ARM. AL LUG  | NOS | 24       |
| 2      | 507-24409-A | TERM. KIT 11KV 3C-240 AL ARM. AL LUG  | NOS | 76       |
| 3      | 507-24495-A | TERM. KIT 3.3KV 1C-240 AL ARM. AL LUG | NOS | 12       |
| 4      | 507-24501-A | TERM. KIT 3.3KV 3C-240 AL ARM. AL LUG | NOS | 4        |

Notes:

1. The ordered quantities indicated above shall be released for manufacture along with LOI.
2. Manufacturing of ordered quantities shall be done after the approval of technical and quality documentation, and Supply of same shall be completed within two months of date of approval of documents.
3. The total quantity variation shall be limited to (+) 20 % of the total contract value derived on the basis of the Order Quantities.
4. Subsequent lots, if any shall be cleared for manufacture based on progress of engineering and site requirements. A lead-time of two months shall be given for completion of supply of each lot from the date of clearance of the quantities.
5. Bidder to offer 6.6kV termination & jointing kits for S. No. 3 & 4 above if they cannot produce relevant type test certificates for 3.3kV kits conducted in any govt. / govt. approved lab.

|   |   |  |                  |
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**ANNEXURE- I-B**

**BILL OF QUANTITIES (BOQ) WITH AL LUGS – TG PACKAGE**

| S. NO. | ITEM CODE   | ITEM NAME                             | UOM | QUANTITY |
|--------|-------------|---------------------------------------|-----|----------|
| 1      | 507-24404-A | TERM. KIT 11KV 1C-630 AL ARM. AL LUG  | NOS | 12       |
| 2      | 507-24409-A | TERM. KIT 11KV 1C-300 AL ARM. AL LUG  | NOS | 48       |
| 3      | 507-24495-A | TERM. KIT 11KV 3C-240 AL ARM. AL LUG  | NOS | 42       |
| 4      | 507-24501-A | TERM. KIT 3.3KV 3C-240 AL ARM. AL LUG | NOS | 30       |

Notes:

1. The ordered quantities indicated above shall be released for manufacture along with LOI.
2. Manufacturing of ordered quantities shall be done after the approval of technical and quality documentation, and Supply of same shall be completed within two months of date of approval of documents.
3. The total quantity variation shall be limited to (+) 20 % of the total contract value derived on the basis of the Order Quantities.
4. Subsequent lots, if any shall be cleared for manufacture based on progress of engineering and site requirements. A lead-time of two months shall be given for completion of supply of each lot from the date of clearance of the quantities.
5. Bidder to offer 6.6kV termination & jointing kits for S. No. 4 above if they cannot produce relevant type test certificates for 3.3kV kits conducted in any govt. / govt. approved lab.

|   |   |  |                  |
|---|---|--|------------------|
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**ANNEXURE – II**

**LIST OF DRAWINGS / DOCUMENTS  
(REQUIRED TO BE FURNISHED BY SUCCESSFUL BIDDER AFTER AWARD OF CONTRACT)**

| Sl. No | Drawings / Document Description  | Drawings / Document Number | Submission schedule by vendor                          |
|--------|--|----------------------------|--|
| a)     | Technical Data Sheet   | PE-V0-400/402-507-E031     | Within two weeks of award of contract                  |
| b)     | Termination & Jointing kits Manufacturing / Detailed Drawing   | PE-V0-400/402-507-E032     | Within two weeks of award of contract                  |
| c)     | Manufacturing Quality Plan   | PE-V0-400/402-507-E904     | Within two weeks of award of contract                  |
| d)     | Type Test Reports for Tests conducted in past years (Ref. Cl. 4.2.0 of section-D enclosed with this spec.)               | PE-V0-400/402-507-E033     | Within <b>two</b> weeks of award of contract           |
| e)     | Type Test Reports for Tests conducted under this contract (Ref. Cl. 4.3.0 & 4.4.0 of section-D enclosed with this spec.) | PE-V0-400/402-507-E034     | Within a week from the date of conduction of Type Test |



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**ANNEXURE - III**

(VENDOR DRAWING/DOCUMENT SCHEDULE)

No. of prints to be submitted by vendor after award of contract for project shall be as under:

**DRAWING/DOCUMENT DISTRIBUTION LIST**

All documents & drawings shall be in English and in metric units

| Sl |  | LII                            | NLC (HQ)             | NLC-SITE              | BHEL SITE            | PMG BHEL  | PEM/ UNITS/ PSSR | REMARKS |
|----|--|--------------------------------|----------------------|-----------------------|----------------------|-----------|------------------|---------|
| 1  | Master list of drawings / document (duly indicating schedule of submission)                    | Soft copy                      | Soft copy            | Soft copy             |                      | Soft copy | Soft copy (S)    |         |
| 2  | Drawings / document for Approval/Information (First Submission)                                | Soft copy + 2 prints           | Soft copy + 3 prints | Soft copy + 1 print   |                      | Soft copy | Soft copy (S)    |         |
| 3  | Return with comments/approval  | Soft copy (S)                  | Soft copy            | Soft copy             |                      | Soft copy | Soft copy        |         |
| 4  | Drawings / Documents for approval (second & subsequent submissions till approval)              | Soft copy                      | Soft copy            | Soft copy             |                      | Soft copy | Soft copy (S)    |         |
| 5  | Drawings / documents for distribution (Approved by NLC, in cat. 1 or Received for Information) | Soft copy + 2 print (HQ+ Site) | Soft copy + 3 prints | Soft copy + 3 prints  | Soft copy + 5 prints | Soft copy | Soft copy (S)    |         |
| 6  | Erection Drawings / documents  | -                              | Soft copy + 1 print  | Soft copy + 3 prints  | Soft copy + 5 prints | Soft copy | Soft copy (S)    |         |
| 7  | As built Drawings / documents  | Soft copy + 1 print            | Soft copy + 1 print  | Soft copy + 3 prints  | Soft copy + 5 prints | Soft copy | Soft copy (S)    |         |
| 8  | Operation & Maintenance Manual   | -                              | Soft copy + 1 print  | Soft copy + 10 prints | Soft copy + 5 prints | Soft copy | Soft copy (S)    |         |
| 9  | Type Test Certificate  | Soft copy                      | Soft copy + 1 print  | Soft copy + 3 prints  | Soft copy + 5 prints | Soft copy | Soft copy (S)    |         |

**NOTES:**

1. The above schedule of submission does not include Docs/Drgs. of quality assurance/inspection and delivery/dispatches. QAP documents to be submitted as per distribution schedule.
2. Date of submitting soft copy is to be taken as date of submission.
3. S – Source for generation of document.



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SECTION – 'D'  
TECHNICAL SPECIFICATION



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**1.0 SCOPE OF ENQUIRY**

- 1.1 This specification covers the design, manufacture, inspection, testing at vendor's/sub-vendor's works, packing, forwarding, transportation and delivery to site of MV termination and jointing kits for cables as per the requirements specified in this specification.
- 1.2 Termination kits shall be of proven design and make, which have already been extensively used and fully type, tested. Make and type of the termination shall be to the approval of purchaser.

**2.0 CODES & STANDARDS**

- 2.1 The material, constructional features and various processes involved in manufacture shall comply with latest revision of relevant Indian Standards.

**3.0 DESIGN REQUIREMENTS AND CONSTRUCTIONAL FEATURES**

- 3.1 The termination/jointing kits shall be suitable for site ambient conditions and polluted atmosphere, and for storage without deterioration at ambient temperature specified in project information for the project execution period.
- 3.2 Termination kits shall be suitable for installation inside motor terminal boxes, metal clad switchgear, transformer terminal box etc. Each kit shall contain all necessary components, accessories and consumables to make a complete termination in such a way that no live parts of the terminals and connecting lugs are exposed.
- 3.3 Kits shall be complete with all accessories and consumables required for complete termination or jointing. Cable lugs for termination kits & jointing ferrules for straight through jointing kits shall form part of the kit. Cable lugs shall be of **Aluminium** & heavy duty type.
- 3.4 Termination and jointing kits shall have requisite stress relieving characteristics.
- 3.5 Termination and joints shall have provision for shield connection and earthing, wherever cable screening is specified.
- 3.6 All materials and components of the terminations/joints shall be suitable for and compatible with the type of cables for which the terminations/joints are intended.
- 3.7 Any surface treatment or sealants used to ensure environmental protection to the components of termination/joint or on the cable surface shall be non-tracking type and shall withstand the associated electric stress.
- 3.8 Cable jointing kits shall be suitable for directly buried cables.
- 2.9 Cable glands are excluded from the scope of supply of termination kit/ jointing kits.

**4.0 QUALITY / INSPECTION:**

- 4.1 All items to be supplied shall conform to type tests as per relevant standards and proven type.
- 4.2 The bidder shall furnish the reports of all the type tests carried out. These reports should be for the tests conducted either in government approved third party laboratory or witnessed by client (such as major utilities/ industries) on identical/ similar items to those ordered under this contract.
- 4.3 In case bidder is not able to submit report of type test(s), or in case type tests report(s) are not found to be meeting the specification/ relevant standard requirements, then all such tests shall be conducted under this



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contract by the bidder free of cost to BHEL, and reports shall be submitted for approval. No charges shall be paid for testing under such circumstances.

4.4 Irrespective of the bidder furnishing type test report as indicated above, BHEL may get type tests conducted as specified in Datasheet-A. Separate price shall be quoted for the conduction of type testing per lot, which shall be used for cost comparison.

4.5 Inspection and testing shall be as per approved Manufacturing Quality Plan, to be submitted by the supplier.

4.6 Bidder shall offer 6.6kV termination kits in place of 3.3kV termination kits, if the relevant type test certificates conducted in any govt./govt. Approved labs are not available. This change shall be brought out clearly on separate sheet as technical clarification.

**5.0 PACKING**

The material shall be packed to ensure protection against damage during transit, storage for prolonged periods and handling. Packing procedure shall be subject to the purchaser's approval.

**6.0 DELIVERY**

The delivery shall be as per NIT (Notice Inviting Tender).

**7.0 DOCUMENTATION**

7.1 Documents to be submitted by the bidder along with the bid.

a) A copy of sheet "Contents" with bidder's signature & company stamp

b) A copy of sheet "Instructions to bidders for preparing Technical offer" with bidder's signature & company stamp.

c) Unpriced copy of "Annexure-I (BOQ – Cum- Price Schedule for Cable Trays & Accessories)" with bidder's signature & company stamp.

**No other documentation is required to be submitted as technical offer. Any information contained in other parts of the offer (e.g. covering letter, annexures, etc.) which is deviating from specification requirements in any way shall not be considered by BHEL as part of offer.**

7.2 Documents to be submitted by successful bidder after award of contract shall be as per Annexure-II.

7.3 Vendor drawing / document schedule for the project shall be as per Annexure – III.



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**DATASHEET A**

**SPECIFIC TECHNICAL REQUIREMENTS**

**1.0 TERMINATION KITS**

- 1.1 Voltage grade: 3.3 kV (U/E) / 11kV (U/E)
- 1.2 Application: Indoor/ Outdoor
- 1.3 Type: Heat Shrinkable/ pre moulded Push on type
- 1.4 Sizes: As per BOQ
- 1.5 Type testing conforming to As per IS 13573

**2.0 STRAIGHT THROUGH JOINTING KITS**

- 2.1 Voltage grade: 3.3 kV (U/E) / 11kV (U/E)
- 2.2 Type: Heat Shrinkable
- 2.3 Sizes: As per BOQ.
- 2.4 Testing requirement conforming to As per IS 13573

**3.0 BRIEF CABLE SPECIFICATION**

- 3.1 Voltage grade: 3.3 kV (U/E) / 11kV (U/E)
- 3.2 Conductor material: Stranded compacted aluminium conductor
- 3.3 Conductor screening material: Extruded Semi conducting compound
- 3.4 Insulation material: Extruded Cross-linked polyethylene
- 3.5 Insulation Screen material
- a) Non-conducting: Extruded Semi-conducting compound strippable
- b) Conducting: Copper tape
- 3.6 Armour: Applicable
- If armoured,
- (i) Single core: Non-magnetic Hard drawn aluminium single round wire  
armour H4 grade



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(ii) Multi core: Galvanised steel round wire armour

3.7 Inner sheath material: PVC Type ST2

3.8 Outer sheath material: PVC Type ST2 (FRLS Type)

4.0 Other Technical Particulars:

4.1 System fault level:

|                | 33kV | 11 kV |
|----------------|------|-------|
| RMS value(kA)  | 40   | 40    |
| Duratlon(sec)  | 1    | 1     |
| Peak value(kA) | 100  | 100   |

5.0 Type testing requirement: - Type test certificates to be furnished in line with clause 4.2, 4.3 of Section-D of specification)

Standard to which type testing shall conform to: IS: 13573



TECHNICAL SPECIFICATION FOR MV  
CABLE TERMINATION & JOINTING KITS

SPECIFICATION NO. PE-TS-400/402-507-  
E015

VOLUME II B

SECTION ---

REVISION 0

REVISION 0

SHEET 1 OF 1

**DATA SHEET - C**

**GURANTEED TECHNICAL PARTICULARS**  
**(TO BE SUBMITTED BY SUCCESSFUL BIDDER)**  
**(SEPARATE FOR EACH TYPE & SIZE OF CABLE)**

**1.0.0 GENERAL**

1.1.0 Name of manufacturer:

1.2.0 Place of manufacture:

**2.0.0 Standard Applicable:**

IS: 13573/ VDE 0278 for testing of kits:

**3.0.0 TECHNICAL DETAILS**

**3.1.0 TERMINATION KITS**

- a) Make:
- b) Type:
- c) Application:
- c) Voltage Grade:
- d) Kit no. as per catalogue:
- e) Applicable conductor size:
- f) Whether previously type tested:
- g) Shelf life of the least durable component: years
- h) Tinned Copper/ Aluminium heavy duty type cable lugs  
form part of termination kits: Yes/No
- i) Total shrouding of all live parts: Yes/No

**3.2.0 STRAIGHT THROUGH JOINTS**

- a) Make:
- b) Type:
- c) Voltage Grade:
- d) Kit no. as per catalogue:
- e) Applicable conductor size:
- f) Whether previously type tested:
- g) Shelf life of the least durable component: years